

DISTRACTORS THAT ARE *TOO* DISTRACTING IN MULTIPLE-CHOICE QUESTIONS

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ABSTRACT

Distractors are the incorrect answer options in multiple-choice questions. Effective distractors should actually be distracting, i.e., plausible to examinees who do not know the correct answer. At the same time, distractors that are easily confused with the correct answer are undesirable; they are *too* distracting. The present study examines distractors of multiple-choice questions accompanying consumer behavior and retailing management texts.

Keywords: item analysis, multiple-choice questions, distractors

INTRODUCTION

All or nearly all introductory-level marketing texts (and those of many other disciplines) are accompanied by banks of multiple-choice questions. Those questions are appropriate candidates for item analysis. *Item analysis* refers to the evaluation of items, i.e., questions, comprising tests. Its purpose is, "...toward the determination of the best possible items for inclusion in a test." (Rogers 1995, p. 388) "In general, the purpose of item analysis is to determine which items should be retained, which revised, and which thrown out." (Gregory 2011, p. 141) Though the field of item analysis is well-established, little such analysis of ubiquitous multiple-choice question banks has been published. Exceptions include Dickinson (2005, 2011) and Dickinson, Faria, & Whiteley (1991) which, specifically, assessed the taxonomies into which the bank questions are invariably classified. In the present item analysis incidences of distractors that are too distracting are described. *Distractors* (also called foils or misleads) are the incorrect answer options among the "choices" in multiple-choice questions.

TOO-DISTRACTING DISTRACTORS

Davis (1951, p. 269) suggests that distractors being too distracting reflects a question design flaw whereby the offending distractors contain partial information or misinformation:

"Anyone who has examined item analysis data, however, knows that only rarely are the incorrect choices in an item found to be equally attractive to the examinees. Presumably, this indicates that examinees who do not know the correct answer are responding not merely on the basis of blind guessing but, to some extent, on the basis of partial information and misinformation"

By intent or inadvertently an incorrect answer may be misleadingly attractive to examinees; in a word, examinees may be fooled into selecting a wrong answer. "...it is possible that the [extreme] difficulty of the item results from the presence of one or two very attractive distractors—wrong answers easily confused with the correct answer." (Friedenberg 1995, p. 286)

A general implication of too-attractive distractors is expressed by Murphy & Davidshofer (1988, p. 130): "For most tests, the presence of items with extremely popular distractors is likely to lower the reliability and validity of the test." A specific implication lies in the phenomenon of pseudoguessing (Hambleton 1989, p. 155) described by Lord (1984, p. 252) as follows:

"...many of the item characteristic curves found so far in the analysis of nationally used tests show that very low-ability examinees tend to *do less well on difficult items than would be done if they had responded at random*. This situation presumably arises because certain of the possible item responses have been cleverly made so attractive that low-level examinees tend to choose them in preference to the correct answer. (italics added)

QUESTION BANKS

Data are analyzed for five multiple-choice question banks, three for consumer behavior texts (including two editions of one text) and two for successive editions of a retailing management text. See Table 1. For the five question banks nearly all questions have five response options. There are just a few exceptions (on the order of two or three questions per bank) and those exceptions are excluded here. Too, a few questions were deemed invalid in that the correct response was not clear in the text and those questions are excluded.

TABLE 1: MULTIPLE-CHOICE QUESTION BANKS ANALYZED

Text	Total Multiple-Choice Questions
Levy, M. & Weitz, B. A. (2012), <i>Retailing Management</i> , Eighth Edition	1196
Solomon, M. R., Zaichkowsky, J. L., & Polegato, R. (2011), <i>Consumer Behaviour</i> , Fifth Canadian Edition	1158
Levy, M. & Weitz, B. A. (2009), <i>Retailing Management</i> , Seventh Edition	1332
Solomon, M. R., Zaichkowsky, J. L., & Polegato, R. (2008), <i>Consumer Behaviour</i> , Fourth Canadian Edition	1019
Hawkins, D. I., Mothersbaugh, D. L., & Best, R. J. (2007), <i>Consumer Behavior</i> , Tenth Edition	1624

MULTIPLE-CHOICE EXAMS

For all of the courses for which data are available, two midterm exams and one final exam were administered. The exams were not cumulative. The first midterm exam covered about the first third of the chapters (6 or 7 chapters depending on the specific text), the second midterm covered the middle third of the chapters, and the final exam covered the remaining chapters (5, 6, or 7 chapters). Exams comprised only multiple-choice questions from the relevant master bank. All exams were worth 20 percent of students' final weighted averages for the course.

Multiple-choice questions are arranged in the test question banks according to the order in which the question content appears in the textbook. For each examination specific multiple-choice questions were selected on a systematic sampling basis (every 8th or 10th question, with varying starting points). The data base of sample questions is summarized in Table 2.

TABLE 2: SAMPLE QUESTIONS

Text	Bank Count	Sample Count	Sample as Percent of Bank	Questions per Exam^b	Students per Exam^b
LW (2012)	1196	149 ^a	12.5	56.1	41.2
SZP (2011)	1158	505	43.6	62.2	36.2
LW (2009)	1332	736	55.3	62.2	36.2
SZP (2008)	1019	674	66.1	56.2	39.9
HMB (2007)	1624	958	59.0	53.2	32.7

a Note the relatively small sample of questions due to the newness of this text edition.

b Mean

ANALYSIS AND GENERAL RESULTS

The basic analysis was to tally the percent of questions from a given bank that had distractors selected by more than 20 percent, more than 40 percent, and more than 60 percent of examinees. Table 3 presents, for example, the percent of HMB (2007) questions for which a single distractor attracted more than 20 percent of student answers (35.8%), the percent of questions for which each of two distractors attracted more than 20 percent of student answers (9.0%), and the percent of questions for which each of three distractors attracted more than 20 percent of student answers (0.6%).

All questions had five options, the one correct answer plus four distractors. Where a student does not know the correct answer (which is true by definition for students selecting a distractor), he or she might select an option at random from among the five options. In this scenario each distractor would

be selected 20 percent of the time. (It is, of course, possible that the student could eliminate one or more distractors and select at random from an effectively reduced number of options.) The “>20%” columns in Table 3 are the base of this benchmark.

From Table 3 perhaps the most meaningful way to summarize the presence of inordinately attractive distractors in the respective question banks are the figures in the “40%” columns. These distractors attracted more than twice the number of responses than would be expected by chance. Between 6.7 percent (LW 2012) and 13.1 percent (SZP 2011) of the sample questions had at least one distractor that attracted more than 40 percent of students’ answers. While the absolute percentages of questions are moderate, there is a significant presence of inordinately attractive distractors in the question banks.

TABLE 3: PERCENT OF QUESTIONS HAVING 1, 2, OR 3 DISTRACTORS ATTRACTING MORE THAN 20, 40, OR 60% OF ALL RESPONSES

Number of Distractors	LW (2012)			SZP (2011)			LW (2009)		
	>20 %	>40 %	>60 %	>20 %	>40 %	>60 %	>20 %	>40 %	>60 %
1	28.2 ^a	6.7	0	43.2	13.1	1.6	31.9	10.5	1.2
2	4.0	0	na	11.3	0	na	6.8	0	na
3	0	na	na	1.0	na	na	0.4	na	na
At Least 1	32.2	6.7	0	55.4	13.1	1.6	39.1	10.5	1.2
Questions		149			505			736	

Number of Distractors	SZP (2008)			HMB (2007)		
	>20 %	>40 %	>60 %	>20 %	>40 %	>60 %
1	37.7	10.8	2.1	35.8	10.8	2.7
2	10.1	0	na	9.0	0	na
3	0.7	na	na	0.6	na	na
At Least 1	48.5	10.8	2.1	45.4	10.8	2.7
Questions		674			958	

a 28.2 percent of the 149 LW (2012) questions had one distractor that attracted more than 20% of all responses, 4.0 percent of the questions had two distractors that each attracted more than 20% of all responses, etc.

THE CORRECT OPTION CRITERION

A formal criterion against which distractors might be assessed is the correct answer option embedded with the distractors. Specifically: “Be quite suspicious of any item if a distractor is chosen more often than the correct alternative. This suggests that either the instruction or the item itself is misleading.” (Nunnally & Berstein 1994, p. 301) “The obvious problem [in an illustrative example of multiple-choice responses] is that high-scoring examinees prefer alternative *a* to the correct alternative, *d*.” (Gregory 2011, p. 145)

Table 4 presents the percent of sample questions having at least one distractor with a greater number of responses than the correct option. Between 8.73 percent (LW 2012) and 18.02 percent (SZP 2011) of the sample questions do not meet the “correct answer” criterion.

**TABLE 4: QUESTIONS HAVING AT LEAST ONE
DISTRACTOR ATTRACTING MORE
RESPONSES THAN THE CORRECT OPTION**

Text	Questions	Percent
LW (2012)	149	8.73 ^a
SZP (2011)	505	18.02
LW (2009)	736	11.55
SZP (2008)	674	14.99
HMB (2007)	958	13.99

a Of the 149 LW (2012) sample questions, 13 or 8.73 percent had at least one distractor with a greater number of responses than the correct answer option.

Table 4 reports results where the percents are based on numbers of questions. A parallel analysis may be done using the numbers of distractors as a base for the percents. (The number of distractors equals four times the number of questions.) On this basis, between 2.69% (LW 2012) and 6.54% (SZP 2011) of all the distractors analyzed do not meet the correct answer criterion (Table 5).

TABLE 5: DISTRACTORS ATTRACTING MORE RESPONSES THAN THE CORRECT OPTION

Text	Distractors	Percent
LW (2012)	596	2.69 ^a
SZP (2011)	2020	6.54
LW (2009)	2944	3.78
SZP (2008)	2696	5.49
HMB (2007)	3832	4.96

a The 149 LW (2012) sample questions contained 596 distractors. Of these 596 distractors, 16 or 2.69 percent had more responses than did the correct answer option.

Finally, Table 6 places the too-distracting distractors in a more human, i.e., student, context. The total number of responses to sample questions from a given text bank is approximately the number of questions multiplied by the number of students taking the exam on which a question appeared. (This is “approximate” due to omitted responses.) Results in Table 6 indicate that as many as 10.15 percent of all student answers (SZP 2011) were drawn to too-distracting distractors. If those distractors “fooled” students then the students’ exam scores were materially and invalidly affected.

TABLE 6: RESPONSES ATTRACTED BY DISTRACTORS HAVING MORE RESPONSES THAN THE CORRECT OPTION

Text	Responses	Percent
LW (2012)	5442	4.23 ^a
SZP (2011)	20812	10.15
LW (2009)	26590	6.71
SZP (2008)	26931	8.31
HMB (2007)	31274	8.21

a Of the 5442 responses to the 149 LW (2012) sample questions, 4.23 percent were to distractors having more responses than the correct answer option.

References available upon request from John Dickinson, MExperiences@bell.net.